

MRC-1 Meterbus to EIA-485 Adaptor Instructions

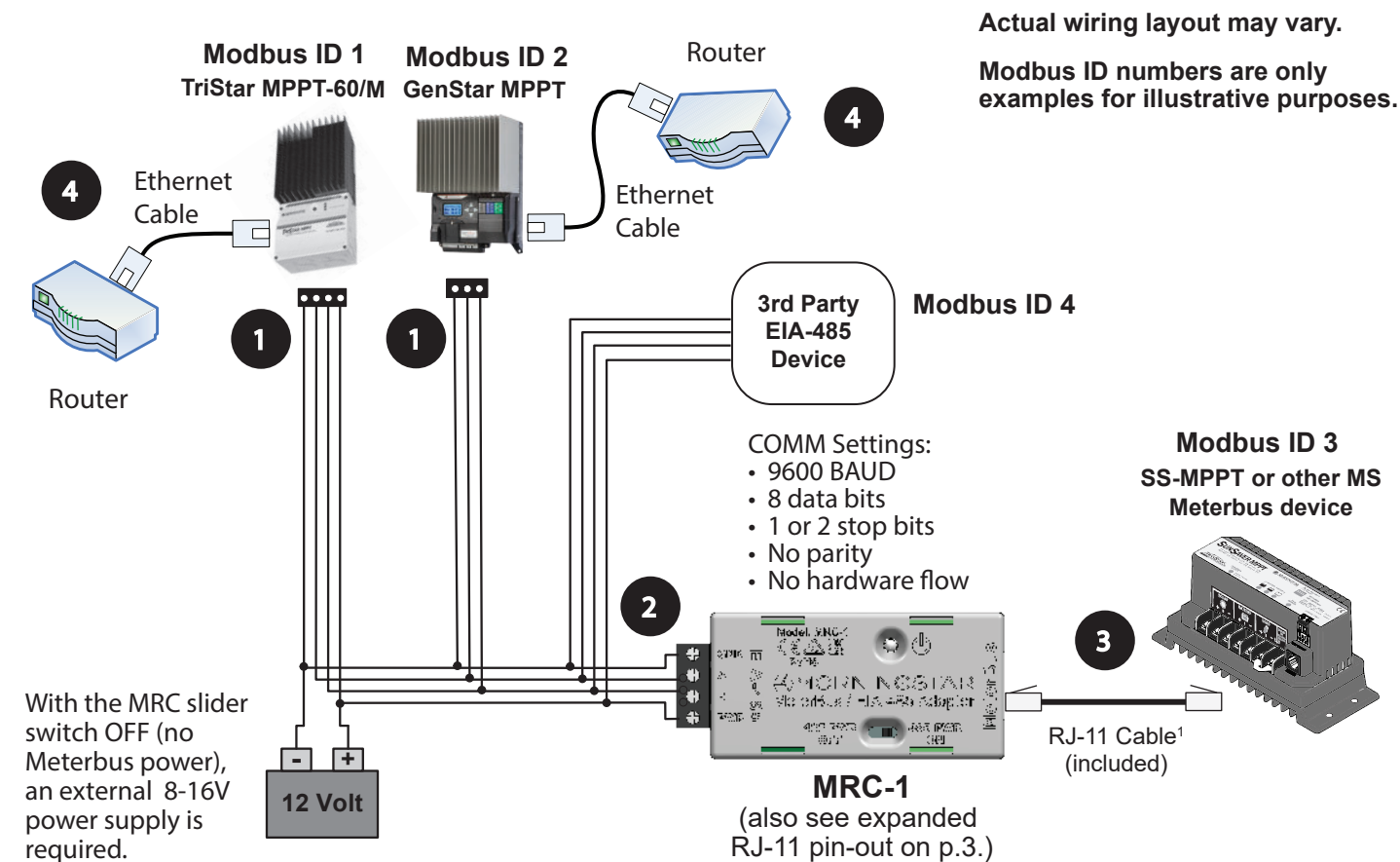


DESCRIPTION

The Meterbus-485 Adaptor (Model: MRC-1), with RJ-11 cable included, converts the Morningstar MeterBus RJ-11 electrical interface to a standard EIA-485 interface. This allows Morningstar controllers or inverters with a Meterbus™ port, but without an EIA-485 communications port, to network with Morningstar EIA-485 devices like the GenStar and TriStar MPPT controllers. The MRC-1 can also be used for EIA-485 communications with any 3rd party hardware that supports Modbus communication.

NOTE: The MRC-1 is protected against reverse polarity at its EIA-485 power terminals.

INSTALLATION-WIRING (see connection steps on next page)



NOTE:

¹ RJ-11 wiring is a straight through cable (standard phone cable)

EIA-485 WIRING

The MRC-1 supports a four wire EIA-485 bus: GND, Data A, Data B, Power. A networked GenStar MPPT will use only three (3) wires: GND, Data A, Data B. Data A and B are differentially driven lines that carry the network data.

The MRC-1 is capable of supplying isolated power to an EIA-485 network, eliminating the need for an external bus power source in many cases. For details, see the Operation section below.

Connections (see diagram on p. 1):

⚠ WARNING: Shock Hazard
Before wiring, verify that all system breakers and disconnect switches are in the OPEN/DISCONNECTED position, and that all fuses are removed from their holders.

1) From left to right, connect GND, Data A, Data B and power wires to a TriStar-MPPT (for example) controller's EIA-485 terminals, and/or GND, Data A, Data B to a GenStar MPPT (for example) controller's EIA-485 terminals.

2) Connect GND, Data A, Data B and Power wires - with the same order and orientation as on the EIA-485 controller(s) - to the MRC-1 Adaptor EIA-485 side or bus. If desired, connect additional unit EIA-485 wires to the bus - ensuring correctly corresponding wiring.

3) Connect an RJ-11 cable to the MRC-1 Adaptor Meterbus side and to a Meterbus device.

3A POWER OPTION - in addition to Step 3:

To power the EIA-485 bus from a 12 Volt system battery, set the MRC-1 slider switch to OFF (left), and connect battery (+) and (-) power wires to the corresponding EIA-485 bus wires.

4) After all wiring has been completed, close all system breakers/fuses and disconnect switches.

OPERATION

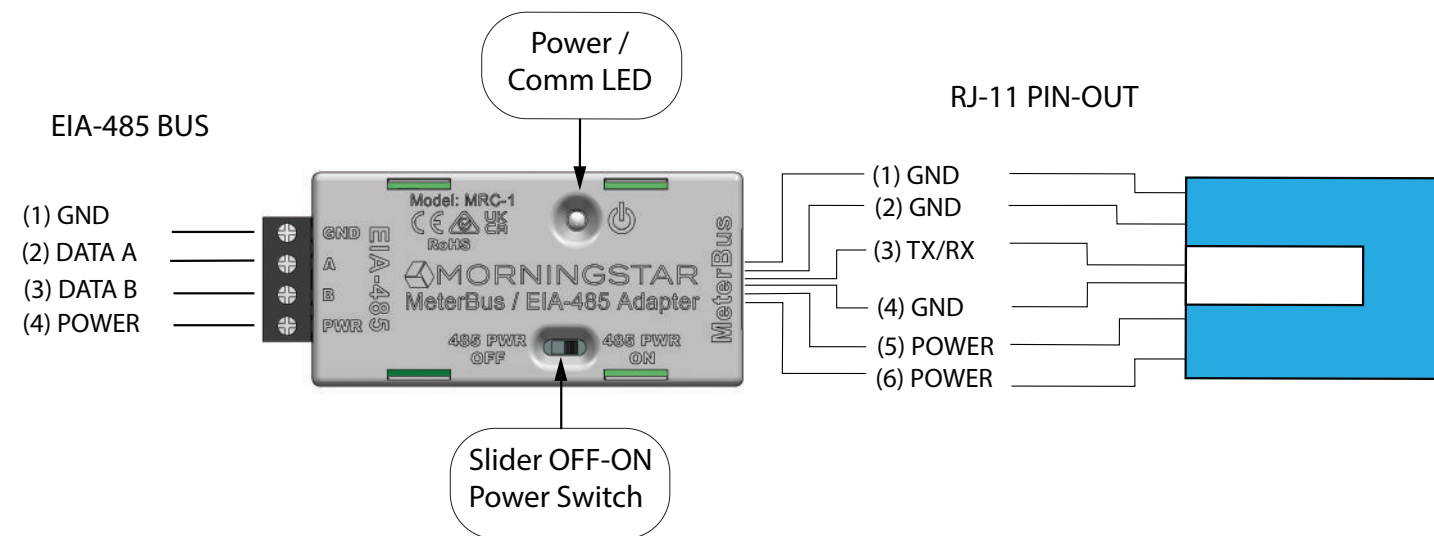
The Power Switch, as seen in the diagram on p. 3, controls the operation of the MRC-1 in providing network power.

- With the power slider switched ON (to the right), connected EIA-485 network devices will be powered by a connected Meterbus device. Also see **Meterbus Power Limitations** on p. 3.
- With the power slider switch OFF, a connected EIA-485 bus must be powered by an external 8-16V power supply as seen in the diagram on p. 1.

A status LED indicates power and communication status. LED indications are as follows:

Green solid LED – power is applied with correct polarity, and the MRC-1 is receiving power from the Meterbus.

Amber/orange LED flicker – data is successfully being transmitted or received through the MRC-1 adaptor.



NOTES:

1. EIA-485 GND is NOT the same ground as the RJ-11 GND. The MRC-1 is fully opto-isolated on all pins.
2. (+) power from the Meterbus port is asserted on RJ-11 pins 5 and 6.
3. (-) power from the Meterbus port is asserted on RJ-11 pins 1 and 2.

Meterbus Power Limitations

CAUTION: Device and Load Operation Power Limitations
 The EIA-485 bus power capacity from a supplying Meterbus device is limited. Depending on the collective power requirements of the EIA-485 network devices, adaptors and any system loads, a supplemental external voltage supply may also be needed.

12 and 24 Volt Systems

For highest EIA-485 bus power reliability in 12 Volt systems, it is recommended to set the MRC-1 slider switch set to OFF; then connect any controller’s 12V system battery to the EIA-485 bus. Follow the connection instructions on p. 2.

The MRC-1 can also operate from a 24 Volt Meterbus device without any voltage adjustments. Either a 12 or 24 Volt system can conservatively power up to (2) RSC-1 adaptors with (1) TS-PWM controller or (4) TS-MPPT controllers.

COMMUNICATIONS

Modbus and Modbus TCP/IP are open standard protocols for communication between connected devices on serial and Ethernet networks, respectively. Select Morningstar devices support Modbus or Modbus TCP/IP communication via serial (EIA-485, RS-232, USB) or Ethernet (RJ-45) ports.

Bridging Ethernet-serial Modbus TCP/IP Requests (see #4 pool balls in diagram on p. 1)

An Ethernet Modbus TCP/IP message with a Modbus ID that differs from the controller Modbus ID can be, “bridged”, and sent out as a serial Modbus message through a controller’s EIA-485

or RS-232 serial port. NOTE: EIA-485 and RS-232 ports share hardware, and cannot be used simultaneously. A response from a connected device on any of those serial networks will be packaged by the controller and sent, as a Modbus TCP/IP response, back to the Ethernet network.

Configure to allow Modbus TCP/IP to EIA-485 bridging and set Modbus IDs (see Modbus ID and Modbus IP Port below) as follows:

- TriStar-MPPT 60/M via MSView - downloadable from Morningstar website - program editing
- GenStar MPPT via LiveView Network\Modbus, or local meter

Modbus ID and Modbus IP port

Each device on a serial Modbus network must have a unique Modbus ID. Each device on an Ethernet Modbus network must have a unique ID and a common Modbus IP port configuration. Factory default settings:

Modbus ID: 1

Modbus IP port: 502

MRC-1 SPECIFICATIONS:

- Meterbus device system battery voltage >11V
- Self-consumption (MRC-1 power switch ON) ~ 8mA
- Consumption (while communicating): ~18mA
- Net current available from Meterbus device (while communicating) ~32mA

MRC-1 WARRANTY:

5-Year limited warranty - for details, go to <https://www.morningstarcorp.com/support/> and click on Warranty Policy

CERTIFICATIONS:



FOR CURRENT DETAILED CERTIFICATION LISTINGS, REFER TO:
<https://www.morningstarcorp.com/support/library>. Under, “Type”, choose, “Declaration of Conformity (DOC)” to view a list of product DOCs - DOC: MS-003957

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